

TRANSPORTATION DECISIONMAKING

Information Tools for Tribal Governments

Data Collection and Use



U.S. Department
of Transportation
**Federal Highway
Administration**

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Data Collection and Use

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ABBREVIATIONS

FHWA	Federal Highway Administration
GIS	Geographic Information Systems
IRRTIP	Indian Reservation Roads Transportation Improvement Program
LRTP	Long-Range Transportation Plan
MPO	Metropolitan Planning Organization
QA	Quality Assurance
QC	Quality Control
TTIP	Tribal Transportation Improvement Program

I. INTRODUCTION

This module, “Data Collection and Use,” is one of eight in the series *Transportation Decisionmaking Information Tools for Tribal Governments* written by the Federal Highway Administration (FHWA) Office of Planning to assist Tribes with transportation planning. This module explains what data is, how it can be collected and analyzed, and how it can be used to support decisionmaking, including the development of the Tribe’s Long-Range Transportation Plan.

1. Introduction to Transportation Planning
2. Developing a Long-Range Transportation Plan
3. Developing the Transportation Improvement Program
4. Funding Resources
5. Public Involvement
6. **Data Collection and Use**
7. Safety
8. Project Prioritization

Figure 1 shows each of the modules in the series.



Figure 1. Transportation Decisionmaking Information Tools for Tribal Governments

Data is organized bits of information collected for a specific purpose. It can be numbers—such as counts or measurements—or it can be words, such as people’s opinion about a project. In transportation planning, data is collected and used to understand the current state of the transportation system and the community’s transportation needs. Planners also collect and analyze data to verify an assumption or determine whether data justifies the development of a particular project. Data important to transportation planning includes:

- Historical trends about the use of the transportation system;
- County, local, and tribal boundaries;
- Location of roads, bridges, buildings, major facilities, and natural resources;
- Number of people who drive, use transit, walk, or ride bicycles; and
- Information on which agencies own and operate transportation facilities.

Data Collection

Data collection involves assembling or gathering the different bits of information. It can be done manually, as in counting the number of cars that use a roadway during a specified period of time, or with sophisticated technology, such as cameras that can read car license plates. Data collection should always include a method of checking data quality. This could involve simply looking at the data to see if it is reasonable or it could be more involved such as comparing with similar data from another source to see if the two data sets are consistent.

Data Analysis

Data analysis is organizing data in specific ways to detect patterns, describe facts, and test assumptions. Analysis simplifies, organizes, and transforms data to help people learn from large amounts of complex information. Using data that has been analyzed to address specific needs helps to make well-informed decisions.

Data analysis is organizing data in specific ways to detect patterns, describe facts, and test assumptions.

III. HOW IS DATA USED IN TRANSPORTATION PLANNING?

Through data collection and analysis, transportation planners can learn more about the conditions and needs of their transportation system. Examples of how data can be used in transportation planning include:

IDENTIFY:

- Tribal land holdings;
- Locations with high crash rates;
- Future economic development zones; and
- Culturally or historically significant sites.

DESCRIBE:

- Indian Reservation Roads (IRR) system inventory;
- Existing transportation system characteristics such as the number of lanes, location of bridges, and traffic volume;
- Demographic trends such as population growth, the fastest growing segments of the population, and the average number of children per family;
- Fire and police department locations and services;
- Transit service routes and ridership;
- Land use; and
- Locations that attract a lot of traffic such as grocery stores and medical centers.

DEVELOP:

- List of roads for a transportation inventory;
- List of necessary transportation projects;
- Prioritized list of transportation projects; and
- Visual representation of transportation projects such as maps, drawings, or models.

In transportation planning for Indian lands, Federal regulations require a Long-Range Transportation Plan (LRTP). In addition,

Tribes are encouraged to develop a Tribal Transportation Improvement Program (TTIP). The purpose of the LRTP is to develop a vision and goals that show a Tribe's transportation needs and anticipated strategies to meet those needs over the next 20 years or longer. The TTIP, in contrast, identifies the specific projects that will be implemented in the next three to five years to help move the Tribe towards meeting the vision and goals presented in the LRTP.

Develop Long-Range Transportation Plan

The LRTP guides investment in the transportation system—the roads, sidewalks, bridges, and transit services used for travel. Strategies included in the LRTP should address future land use, demographic changes, economic development, travel demand, public safety, and health and social needs. The LRTP is expected to include projects that address short-term as well as long-term needs.

The LRTP answers questions about how the Tribe should invest its transportation money to create an efficient, safe, and durable transportation system. The questions might include:

- Should the Tribe build new roads to enhance economic development? If so, where should the roads be built?
- Are the existing roads in good shape and safe?
- How can road safety be improved?
- What does the community think about sidewalks and bike lanes? Should they be added to the roadway?

Table 1 shows the types of data tribal planners use to develop the LRTP.

CATEGORY	EXAMPLES OF USEFUL DATA
Demographic Data	Current and projected: <ul style="list-style-type: none"> • Population • Age ranges • Gender breakdown • Average household size
System Inventory	<ul style="list-style-type: none"> • Miles of roadway • Miles of paved roadway • Miles of sidewalk • Number of transit vehicles • Number of bridges
System Use	<ul style="list-style-type: none"> • Traffic volume • Transit ridership • Number of pedestrians • Number of bicyclists
Physical Conditions and Operations Performance	<ul style="list-style-type: none"> • Type of land use • Congestion • Physical condition of bridges • Age of transit vehicles

Table 1. Examples of Data Used in an LRTP.

Demographic Data

Demographic data answers questions about the people currently using the transportation system and who might use the system in the future. Examining demographic data helps transportation planners determine whether the existing roadways, sidewalks, and other transportation facilities are sufficient for the current population and what changes should be made to accommodate population growth.

System Inventory

System inventory data answers questions about who owns or is responsible for each part of the transportation system. Answering these questions helps transportation planners compile information about the existing transportation system, classify roads by volume and condition, and identify system features such as bike paths and sidewalks. This data provides planners with a starting point for evaluating proposed projects with respect to the current transportation system.

System Use

Traffic and transit service data can answer questions about how people travel, such as the number of miles driven, the time of day of travel, and how they travel—car, bus, by foot, or bike. Answering these and related questions helps transportation planners decide how roads and other transportation features should be changed to ensure good traffic flow and provide adequate transit service. This data helps planners decide where to locate new transportation investments such as new roads, expanded transit service, or additional sidewalks based on the number of people expected to use the facilities once they are in place.

Physical Conditions

Data on the condition of the bridges, pavement, and transit equipment answers questions about facility wear and tear and how the physical conditions of the transportation network affect travel, now and in the future. Answering these questions helps transportation planners assess a facility’s remaining useful life and determine when it will need to be improved or replaced.

Information on how land is used—such as for houses, shopping centers, crops, nature preserve—helps to answer questions about how a specific location’s

land use affects people's travel on particular roadways or transit services. Answering this and related questions allows transportation planners to identify where roads should be built and how land should be used to make it easier for people to get from their home to where they work, shop, or spend their leisure time. Planners can also use the data to minimize the impact that the transportation system has on natural resources and other sensitive areas.

Operations Performance

Operations performance refers to the use of the transportation system rather than its physical characteristics. Data on operations performance helps answer questions about congestion, safety, people's ability to access and use the transportation system, and how the operations performance of the transportation system affects people's ability to travel where and when they want. The answers to these and related questions help planners determine how to reduce the growth of congestion, make travel safer, and meet the transportation needs of everyone in the community.

Once data is collected, it should be analyzed to pinpoint the problems or needs that the LRTP should address.

Identify System Needs

Once data is collected, it should be analyzed to pinpoint the problems or needs that the LRTP should address. Looking at current or "baseline" conditions compared to the projected needs helps to determine what changes will be necessary to meet the community vision and goals for the future transportation system. Table 2 shows examples of changes in transportation system characteristics over time and how the current system should be modified to meet the future needs. An analysis of a particular transportation system might include some or all of these categories and will also probably include others as well.

Select Projects and Strategies

In addition to determining system needs, data can also help a transportation planner evaluate project alternatives to find the most appropriate solution or project to include in the LRTP. The LRTP should include projects that are likely to be funded over the life of the plan and that help achieve the community vision and goals outlined in the plan. Data used to define goals or evaluate the transportation system performance is a good starting point for the project selection process.

Prioritize and Rank Projects

Once projects are selected, they must be prioritized. This is usually done based on two considerations: (1) the immediate need for the project and (2) the availability of funding. Similar to the project selection process, data is often used to help demonstrate why one project should be a higher priority than others. For example, data might show that one roadway's condition is substantially worse than other roadways, making its reconstruction the highest priority.

Fund Projects

Besides relying on data to understand transportation needs, Federal, State, and other non-tribal agencies also use data to allocate funding. Financial data can help tribal transportation planners understand past trends in funding and project future funding. This data can also be used to estimate when funding might be available for specific projects and how much money will be available over both the short and long terms.

Monitor and Revise LRTP

It is important to continually monitor data used in the LRTP to detect changes that could influence the projects or programs outlined in the plan. For example, a Tribe's current LRTP includes constructing new roadways and sidewalks for access to a new visitors' center. When the visitors' center and new infrastructure are completed, there is expected to be an increase in traffic to the visitors' center and on the surrounding roadway system leading to the new facility.

CATEGORY	CURRENT CONDITION	FUTURE CONDITION	CHANGE
Demographics	Population: 10,000	Population: 15,000	Growth: 50 percent
	Average age – 40	Average age – 35	Population getting younger
Economic Development	Employment: 7,500	Land Use Zones	Growth: 60 percent
	No Casino	Casino in operation	New employment center
	Visitors' center planned	Visitors' center completed	New tourist attraction
Infrastructure	20 bridges rated adequate	15 bridges rated adequate	5 bridges deteriorated
	30 buses in operation	35 buses in operation 10 buses too old to operate safely and efficiently	5 additional buses are needed; 10 buses will need to be replaced
	25 miles of walkway	50 miles of walkway	25 miles of additional walkway needed
	50 miles of bikeway	75 miles of bikeway	25 miles of additional bikeway needed
System Use	Average volume of 800 vehicles per day on main road	Average volume of 1,000 vehicles per day on main road	Growth: 25 percent
	Vehicles drive a total of 2,000 miles per day	Vehicles drive a total of 3,000 miles per day	Growth: 50 percent
	Transit average 100 passengers per day	Transit average of 200 passengers per day	Growth: 100 percent
	5 percent of all trips are by walking	10 percent of all trips are by walking	Growth: 100 percent
Operation	1 congested intersection	10 congested intersections	9 new congested intersections
	3 intersections with traffic lights	10 intersections with traffic lights	7 additional intersections with traffic lights needed
	15 traffic deaths per year	10 traffic deaths per year	Decrease: 33 percent
	2 deaths per 100 million total miles traveled by all vehicles per year	1.5 deaths per 100 million total miles traveled by all vehicles per year	Decrease: 25 percent
	5 pedestrian deaths per year	4 pedestrian deaths per year	Decrease: 20 percent

Table 2. Analysis of Current and Future Conditions of a Transportation System

Travel and traffic changes on the new facilities and the surrounding existing facilities should be tracked to understand the impact the new visitors' center is having on the transportation system as a whole. If more people are using the sidewalks, for example, this will probably affect traffic or transit use in the rest of the transportation system.

As another example, safety improvements made to some intersections have vastly improved safety and capacity of the main road in the community. This might reduce the number of crashes sufficiently so that other projects previously identified as needs are no longer necessary. As data becomes available and is collected and analyzed, it might be appropriate to make changes to the LRTP so that it better reflects the Tribe's ever-changing transportation needs.

It is important to continually monitor data used in the LRTP to detect changes that could influence the projects or programs outlined in the plan.

Use Data for Tribal and Indian Reservation Roads Transportation Improvement Programs

The TTIP and the Indian Reservation Roads Transportation Improvement Program (IRRTIP) are the short-range programs that prioritize projects over the next three to five years. Projects included in the TTIP and IRRTIP should be consistent with the goals and vision set out in the LRTP. As with the LRTP, data is critical to making informed decisions when prioritizing projects. For more information on these programs, see *Transportation Decisionmaking Information Tools for Tribal Governments: Developing the Tribal Transportation Improvement Program* at http://www.tribalplanning.fhwa.dot.gov/training_ttip_module.aspx.

When possible, Tribes should use existing data instead of embarking on expensive activities to collect original data. Understanding who has or owns the data is important. Data available through government agencies is often free or sold for a nominal fee. Data owned by private entities often must be purchased. Some existing data might need to be analyzed or formatted to make it useful for transportation planning purposes. This section focuses on sources of data that are readily available to Tribes at little or no cost.

Data Already Available within the Tribe

Identifying data sources within the tribal community should be the first step in the data collection process. When considering whether data is appropriate, consider how it will help tell the story of the current and future transportation system.

Examples of possible data sources within the tribal community include:

Existing Plans, Studies, Reports, and Surveys

Whether it is a new medical clinic, school, or building permit application, decisions within the community are generally made using plans, studies, or reports. These documents often have data that could be useful in transportation planning. Tribal planners should work with the Tribe's other offices such as Indian Health Service, public safety, the school district, or Public Works department to identify recent studies or planning efforts that contain transportation data.

Planners should discuss with these agencies how and when the data was collected and analyzed to ensure it is current and suitable for transportation planning purposes. It is best to work with raw, unanalyzed data so that the data can be analyzed to specifically address transportation issues. However, sometimes only summary data is available through final reports or studies. Summary data can be used to characterize transportation issues and trends and help determine whether additional data collection is needed.

Talk to the Tribal Community

Often, the people living and working in the community have information or access to information that could be used in transportation planning. For example, the Tribe might have information on people's opinions about various issues gathered at public meetings or focus groups. Other data such as a log of phone calls, letters, or e-mails sent to the transportation office might also contain information useful in transportation planning.

Some of the most useful data for transportation planning comes first-hand from Tribe members when they express concerns and opinions about the current and future transportation system on tribal lands. For example, transportation planners from the Lummi Nation in Washington State wanted to learn about their community's transportation concerns. The planners spoke with Tribe elders and then to others in the community. Through these conversations, they learned that young people frequently walked on unlit roads at night. Without street lights or special

light-reflective clothing or accessories, drivers could not see the pedestrians. This observation highlighted the need for more roadway lighting and pedestrian safety education. Both issues were included in the Tribe's LRTP.

Another example is from the Navajo Nation. After completing a first draft of the Tribe's 2030 LRTP, transportation planners wanted to hear from the community how they felt about the initial draft of the plan. While it was difficult to get people to attend the meeting and provide comments, the Navajo Nation nonetheless received many questions and comments about the plan. These helped the Navajo Department of Transportation revise the draft plan to include additional issues and strategies that were important to the Tribe.

The list below contains possible local sources of data:

- **Casino operators** might collect demographic, socioeconomic, and other types of data to learn about current and potential customers.
- **Indian Health Service** might collect data on transportation needs for their clients. To find your local Indian Health Service facility, go to <http://www.ihs.gov/index.cfm?module=AreaOffices>.
- **Tribal government agencies** usually have a range of demographic, safety, land use, socioeconomic, and other types of data relevant to transportation planning. Documents such as planning and land use policies or results from environmental, household, or transportation performance surveys could provide valuable data.
- **State and local police departments** keep detailed crash data. Crash data generally includes where and when the crash occurred, whether anyone was injured or killed, and contributing factors such as weather, speed, or driver behavior that might have played a role in the crash.
- **Day care centers, Head Start programs, dial-a-ride services, and meal delivery programs** offer demographic, socioeconomic, and possibly transportation data for people with special transportation needs. This data can help inform transportation planners about where special needs populations live, where they need to go, and how they use the current transportation system.
- **Public school administrative offices** collect various kinds of data on students. In addition, maps of school districts can be helpful for planning purposes. They can be found at the National Center for Education Statistics website (<http://nces.ed.gov/surveys/sdds>). The maps offer demographic and economic data, such as per capita income, as well as geographic information for mapping.
- **Libraries** often have copies of plans, studies, and reports from many different local, regional, and State agencies. Many libraries provide free access to online databases offering a broad range of demographic, economic, safety, and other data useful for transportation planning.
- **Medical and public health facilities** collect data that might include some transportation-related statistics such as where patients live and what types of transportation they use to get to the facilities.
- **Local colleges or university extensions** often include urban planning and agricultural extension departments that use or develop data related to transportation, public policies, economics, and demographics.
- **Freight shipping facilities** such as private port operators, airline carriers, or freight carriers at nearby airports, seaports, or land-based port operations might provide information about how shippers use the transportation system or how proposed changes might affect their operations. Available data might include the number of airline passengers, cargo shipments, cargo tonnage, and landing fees. However, the data belongs to private port or shipping companies who consider it private information about their business operations; and, therefore, may be reluctant to offer or sell the data.
- **Area businesses and employers** often collect descriptive (qualitative) information about their customers and employees. This data can help to understand when the most customers are traveling to and from the business, the traffic volume when shift changes occur, or where customers and employees begin their trips.

- **State, county, and city departments of transportation** typically collect information on demographics, land use, economic activity, travel time, travel safety, and other data useful for transportation planning and decisionmaking. This can help a Tribe understand traffic conditions when its transportation system meets up with the transportation network outside Indian land.
- **Metropolitan Planning Organizations (MPOs)** are regional government agencies required by Federal law to conduct transportation planning and programming for a metropolitan area. Data collected, analyzed, and used by an MPO might be helpful to Tribes that are doing transportation planning similar to that done by the local MPO. Where tribal land is located within the boundary of the metropolitan area, the MPO probably collects data about transportation on these lands. Even in cases where tribal lands are located outside the MPO planning area, the MPO might collect data about transportation in and around tribal lands to understand the impacts and influences of the Tribe's transportation network on transportation within the MPO's designated planning area. A list of MPOs by state can be found at <http://www.planning.dot.gov/default.asp>.
- **State departments of revenue and finance** might be able to provide demographic and socioeconomic data including taxes, income, property values, and other related topics.
- **State departments of motor vehicles** collect data on licensed drivers and vehicles such as the number of registered vehicles, the type of vehicles, and number of licensed drivers.
- **State departments of natural resources** focus their data collection on natural resources, recreational areas, and other related topics. This data is helpful in transportation planning to ensure that transportation planning considers the impacts on natural resources.

Data Available on the Internet

The Internet is a good source of data, especially from government agencies. In some cases, the raw data is not available. Instead, it is available only by category such as ranges for income or property values. However, even in this format, data sets can help characterize area-wide trends, issues, and future needs. The websites listed below contain data relevant to tribal transportation planning.

- **IRR Inventory** (<http://www.doi.gov/bia/roadreservation.html>) has information on roads, route numbers, bridges, current and projected future traffic volumes, maintenance responsibilities, and road ownership on Indian lands.
- **The Federal Highway Administration** (<http://www.fhwa.dot.gov/policyinformation/index.cfm>) has reports and other publications that contain statistics on highway performance and conditions.
- **The Federal Transit Administration/National Transit Database** (<http://www.ntdprogram.gov/ntdprogram>) has data on public transportation including ridership, safety, and rural transportation.
- **The Bureau of Indian Affairs** (<http://www.doi.gov/bia>) has results from transportation or traffic studies it has conducted for specific tribal areas. Tribal planners can also request maps or land-ownership information for specific roadway projects.
- **The United States Census Bureau** (<http://www.census.gov>) has detailed information on a wide variety of topics including socioeconomic data, population, number of houses per square mile, population by age, occupation, daily commutes, and income per person.
- **The Census Bureau Topologically Integrated Geographic Encoding and Referencing Files** (known as TIGER files) (<http://www.census.gov/geo/www/tiger>) provide maps and other information on features such as roads, railways, rivers, and lakes.

- **The United States Bureau of Labor Statistics** (<http://www.bls.gov>) has labor-related information such as unemployment rates, types of jobs in a specific area, and locations of major employment centers.
- **Bureau of Transportation Statistics** (<http://www.bts.gov>) has a range of information on demographics, transportation, traffic, system conditions, and safety. Depending on the search topic, the database might refer the users to other databases offering information on transit, rail, highways, bicycle, and pedestrian activities (<http://www.transtats.bts.gov>).
- **The National Highway Traffic Safety Administration** (<http://www.nhtsa.dot.gov>) has data on motor-vehicle-related safety issues such as crash rates and locations, crash severity, drivers under the influence of drugs or alcohol, and causes of crashes.
- **The National Highway Institute** (<http://www.nhi.fhwa.dot.gov/home.aspx>) provides courses on transportation and land use planning, travel demand forecasting, data collection, and many other topics.
- **Indian Health Service** (<http://www.ihs.gov>) has information from studies on health care delivery and safety for Indian Tribes. These might contain useful demographic information.
- **The United States Geological Survey** (<http://www.usgs.gov>) has maps on natural resources, aerial photographs, digital maps, land use, flooding, and geological information. It might also offer results of geological studies in certain areas, as well as satellite images of those areas.
- **Google Maps** (<http://maps.google.com>) has free aerial photographs, maps, and other geographic information. The Google Earth program can be downloaded for free from <http://earth.google.com>.
- **State Geographic Information Systems (GIS)**
Clearinghouses may store all the State's GIS data. GIS are programs that display data on maps based on location. A list of GIS and map resources for each state is provided at http://libweb.uoregon.edu/map/map_section/map_Statedatasets.html.

detailed information. However, they are usually very expensive to conduct. Tribes can partner with other organizations interested in the same types of data and share the cost of the survey between the Tribe and the partner organization(s). Partners might be universities interested in giving their students experience in data collection and analysis. Local businesses and employers might be interested in partnering to better understand where their customers live or work. Other government agencies often need similar data for their own planning efforts and view partnering as an opportunity to reduce their own data collection costs. Public safety departments might want to understand driver behavior and need information about roadway safety on tribal lands.

Tribes can get help funding data collection and analysis from programs in the Federal, State, and sometimes local governments. For more information on funding for transportation planning, see *Transportation Decisionmaking Information Tools for Tribal Governments: Funding Resources* at http://www.tribalplanning.fhwa.dot.gov/training_fund_module.aspx

Partnerships to Develop Data

Data collection can be very costly. Partnering is an effective way to reduce costs. For example, surveys are often the only way to obtain current, accurate, and

Data management and maintenance are continuous processes used to make sure that data is current, consistent, and reasonable. Quality Assurance (QA) ensures that the data collection method can be repeated and provide consistent or similar data results every time. Quality Control (QC) is an evaluation method that looks at data to determine if it is reasonable and consistent.

Quality Assurance and Quality Control Examples

For example, QA for data collection to study traffic on a four-lane road requires the tribal planner to set up traffic counters across all lanes for four or five consecutive weekdays. QA also includes periodic checking of traffic counters to make sure that they are working and to note any broken equipment or odd-looking data. Once the traffic data is collected, the QC process is initiated, which looks at the full set of data to determine if the recorded data is within a reasonable range of what is expected. If for example, no traffic is counted for a full day or if the traffic count is significantly higher or lower on one counter, the QC process would highlight that day's data as not being credible and it would not be used to tell the story of traffic on the four-lane road.

Data Maintenance

Data and the things it describes are constantly changing. It should be reviewed, updated, revised, or discarded to ensure that it is:

- **Collected in a timely manner.** Data must be collected and reviewed in a timely manner so that it can capture quick-changing conditions. Safety data, for example, is very time-sensitive. Planners want safety data as quickly as possible so that they can analyze it and plan safety improvements as soon as possible.
- **Consistent with current or “normal” conditions.** Traffic data should be collected continuously since conditions change quickly depending on the season, roadway conditions, changes in land use, and other factors. By using data collected continuously, Tribes can plan for routine traffic such as morning and afternoon rush hours and develop special strategies for non-routine events such as snowstorms.
- **Relevant and applicable to the specific decisions it is intended to inform.** Consider, for example, a Tribe that wants to assess the condition of the bridges on its land and has already collected information on pavement condition. By itself, this data is not sufficient to draw conclusions about bridge condition. To make an informed judgment about overall bridge conditions, pavement data must be combined with information about the bridge structure.

“Bad” Data

Data becomes “bad” when it is too old, no longer reflects current conditions, or is somehow flawed by the collection or analysis methods used. If bad data is detected, the tribal planner must decide if the data set can be salvaged by, for example, adding new data to the data set, or if the best strategy is to start over with a more rigorous data collection effort.

Review and Update of Data

Each data set has its own unique update and review cycle based on how frequently it changes. Data that does not change rapidly, such as the condition of the roadway surface, might require only annual or periodic review; whereas, for the data that changes continuously, such as traffic volume, more frequent collections may be needed. The tribal planner might want to set up criteria and schedules for reviewing the different types of data. Table 3 provides an example of a data review and update timetable.

TIME FRAME	DATA SET	DATA ITEM
As needed, when new data is available	System Inventory	Road Mileage
	System Inventory	Sidewalk and pedestrian paths
	System Inventory	Bike paths
Weekly, Monthly, Seasonally	System Inventory	Land use zones
	Traffic	Hourly traffic counts
	Traffic	Total miles traveled by all vehicles over a given period
	Transit	Ridership
	Finance	Funding obligations
	Finance	Construction expenditures
	Motor Fuel	Gallons purchased
Annually	Bridge	Bridge structural inspection
	Finance	Revenue forecast
	Safety	Fatal crashes
Periodically	Demographics	Population
	Bridge	National Bridge Inspection Standards Rating
	Pavement	Condition survey (every three years)
	Transit	Equipment replacement

Table 3. Sample Data Review and Update Timetable

Data can help planners “tell the story” of the community transportation system and needs. Planners can use software that can combine different types of data and display it on maps or other visual format that is easy to understand. Maps and visualization techniques help “paint the picture” for an audience and show them information about their transportation system and what needs to be done to achieve the vision and goals set out in the LRTP.

Geographic Information Systems

Geographic Information Systems (GIS) use computer software, hardware, and data to link data to its geographic location, creating maps and other visual displays that show how certain characteristics vary across different locations. GIS information is often displayed in “layers” so that a map can show a single characteristic (e.g., type of roadway surface) or multiple characteristics at the same time (e.g., type of roadway surface, number of lanes, and traffic volume).

Tribe transportation planners can use GIS to combine data that shows the location of transportation projects with other data that shows local land characteristics to produce a map that identifies land parcels and environmentally sensitive areas that might be affected by a proposed transportation project.

Visualization Techniques

To strengthen public participation and help the public and decisionmakers understand proposed transportation projects, Tribes are encouraged to use visualization techniques such as drawings, animations, GIS maps, and computer models. These visual tools create displays that are easy to understand. They communicate a lot of information quickly and clearly to viewers, allowing them to get a good understanding of proposed policies and plans.



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